Course: Big Data

Lab 05

PySpark - DataFrame

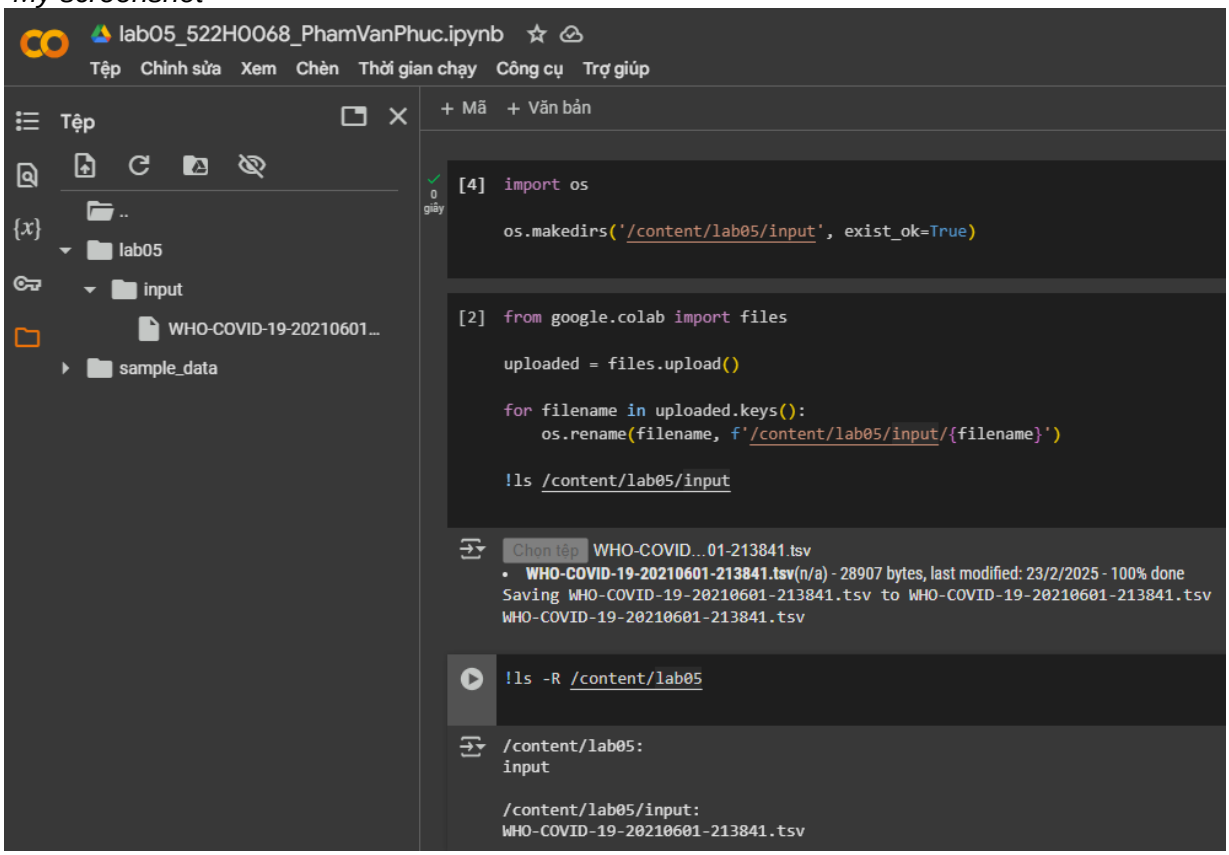
Question 1:

Given a tsv file [WHO-COVID-19-20210601-213841.tsv]() which is corresponding to the [WHO Coronavirus (COVID-19) Dashboard]().

Students are required to create a folder, named **lab05**, in **/content** directory of Google Colab and then copy the tsv to **/content/lab05/input/**

Take a screenshot to show your work.

My screenshot



Question 2:

Write a PySpark program, located in **ASEANCaseCount.py**, using DataFrames to

- to count the number of cumulative total cases among ASEAN countries (*South-East Asia Region in the given data table*)
- to find the country with the maximum number of cumulative total cases among ASEAN countries.
- to find the top 3 countries with the lowest number of cumulative cases among ASEAN countries.
- Insert your source code into the table below.

```
from pyspark.sql import SparkSession
from pyspark.sql.functions import col, sum as spark_sum, regexp_replace
from pyspark.sql.types import StructType, StructField, StringType,
DoubleType

spark = SparkSession.builder.appName("ASEAN COVID-19 Case
Count").getOrCreate()

file_path = "/content/lab05/input/WHO-COVID-19-20210601-213841.tsv"

schema = StructType([
    StructField("Name", StringType(), True),
    StructField("WHO Region", StringType(), True),
    StructField("Cases - cumulative total", StringType(), True),
    StructField("Cases - cumulative total per 100000 population",
StringType(), True),
    StructField("Cases - newly reported in last 7 days", StringType(),
True),
    StructField("Cases - newly reported in last 7 days per 100000
population", StringType(), True),
    StructField("Cases - newly reported in last 24 hours", StringType(),
True),
    StructField("Deaths - cumulative total", StringType(), True),
    StructField("Deaths - cumulative total per 100000 population",
StringType(), True),
    StructField("Deaths - newly reported in last 7 days", StringType(),
True),
    StructField("Deaths - newly reported in last 7 days per 100000
population", StringType(), True),
    StructField("Deaths - newly reported in last 24 hours",
StringType(), True),
    StructField("Transmission Classification", StringType(), True)
])
```

```
df = spark.read.csv(file_path, sep="\t", header=True, schema=schema)

df_cleaned = df.withColumn("Cases - cumulative total",
                           regexp_replace(col("Cases - cumulative
total"), ",", "").cast(DoubleType()))

asean_countries = [ "Indonesia", "Democratic People's Republic of
Korea",
                    "Myanmar", "Thailand", "India", "Bangladesh",
"Nepal", "Sri Lanka", "Maldives", "Timor-Leste", "Bhutan"]

asean_df = df_cleaned.filter((col("WHO Region") == "South-East Asia") &
(col("Name").isin(asean_countries)))

total_cases_row = asean_df.agg(spark_sum(col("Cases - cumulative
total")).alias("Total Cases")).collect()[0]
total_cases = total_cases_row["Total Cases"] if total_cases_row["Total
Cases"] is not None else 0
print(f"Total cumulative COVID-19 cases in ASEAN countries:
{int(total_cases)}")

max_case_country = asean_df.orderBy(col("Cases - cumulative
total").desc()).first()
if max_case_country:
    print(f"Country with the highest cases: {max_case_country['Name']} -
{int(max_case_country['Cases - cumulative total'])} cases")
else:
    print("No data found for highest cases.")

lowest_cases_df = asean_df.orderBy(col("Cases - cumulative
total").asc()).select("Name", "Cases - cumulative total").limit(3)
print("Top 3 countries with the lowest cumulative cases in ASEAN:")
for row in lowest_cases_df.collect():
    print(f"{row['Name']} - {int(row['Cases - cumulative total'])}
cases")

spark.stop()
```

- Take a screenshot of the terminal to visualize the program result.

My screenshot

```
Total cumulative COVID-19 cases in ASEAN countries: 31923614
Country with the highest cases: India - 28175044 cases
Top 3 countries with the lowest cumulative cases in ASEAN:
Democratic People's Republic of Korea - 0 cases
Bhutan - 1620 cases
Timor-Leste - 6994 cases
```